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March 24, 2009

Ms. Christy McCormick
Environmental Scientist - Hazardous Waste Permits Section
Kansas Department of Health & Environment
Bureau of Waste Management
1000 SW Jackson St., Ste. 320
Topeka, KS 66612-1366

Re: Abbott's Proposed Post-Closure Plan - Former Evaporation Lagoon
Abbott Property, Wichita, Kansas
EPA I.D. No. KSD981495567

Dear Ms. McCormick:

Enclosed are the revised sections of Abbott's proposed Post-Closure Plan (PCP) and associated Sampling and Analysis Plan (SAP) for our former evaporation lagoon in Wichita, Kansas. These sections have been revised to address your comments outlined in your march 17, 2009 email. To facilitate your review of the revised sections, I have reiterated your comments (*in italics*) and provided Abbott's responses below.

1. *KDHE would like the last two sentences of page 4 removed. This statement is not in agreement with table 2 of the PCP.*

Response: Abbott has revised the ending of Section 3.0 to state: "However, with the exception of benzene and toluene, these contaminants as well as ethylbenzene and xylene have not been attributed to Abbott. These contaminants are from other non-Abbott sources."

2. *As Oxychem is not sampling the leachate during their sampling schedule, all compounds on the letter dated June 23, 2008 must be sampled for during the regularly scheduled sampling period. As the first sampling event will include an Appendix IX sampling of the leachate, this change will not affect the first sampling round.*

Response: Abbott has revised Sections 3.2 of the PCP and Section 5.1.2 and table 3 of the SAP to include the following compounds as analytes for each of the leachate samples:

RCAP RECEIVED

MAR 31 2009



RCRA

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March 24, 2009

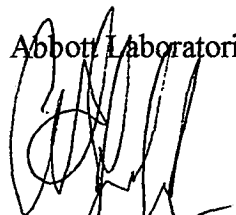
- Methylene chloride
- 1,1-Dichloroethane
- 1,2-Dichloroethane
- Trichloromethane
- Trichloroethylene
- Tetrachloroethylene
- Tetrachloromethane
- Vinyl chloride
- Benzene

Adding these analytes captures all of the compounds in your June 23, 2008 letter.

If you have any questions, or require additional information, please let me know.

Best regards,

Abbott Laboratories



Curtis R. Michols
Principal Specialist
Global Environment, Health & Safety

c.c: D. Garrett, US EPA

POST-CLOSURE PLAN FOR THE FORMER EVAPORATION LAGOON

*Former Abbott Property
Wichita, Kansas*

March 2009

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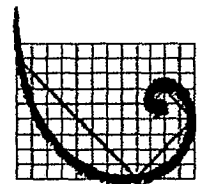
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Abbott

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ERM

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This document is Abbott's Post-Closure Plan for the former Abbott evaporation lagoon in Wichita, Kansas and was prepared cooperatively by Abbott Laboratories and Environmental Resources Management. This Post-Closure Plan addresses comments provided by the Kansas Department of Health and Environment (KDHE) in their letter dated June 23, 2008 regarding Abbott's draft Closure Plan that was submitted in July 2007 and supporting documentation submitted by Abbott in April 2008. This Post-Closure Plan also reflects the discussions between Abbott and KDHE during conference and other calls in September, October, and November of 2008 as Abbott worked to finalize this plan. Comments provided by KDHE to Abbott in correspondence dated December 30, 2008, and further clarification received during a teleconference convened on January 7, 2009, are also addressed in this document.

This plan consists of 5 key steps as follows:

- Step 1 - Cap Enhancement
- Step 2 - Collection and Monitoring of Leachate
- Step 3 - Operations & Maintenance Plan of Lagoon Cap
- Step 4 - Confirmation of Limited Groundwater Contaminants
- Step 5 - Implementation of Monitored Natural Attenuation to Closure

Each of these steps is detailed in the following sections. Abbott has already completed Steps 1 through 4 (with the exception of additional monitoring to be conducted in Steps 2 and 3) in accordance with various correspondences and approvals by the KDHE.

Monitoring data indicated that the previously constructed cap covering the former evaporation lagoon did not sufficiently prevent the generation of leachate; therefore, it was replaced with an enhanced cap. The enhanced cap was engineered and constructed with impermeable materials and proper grading to prevent ponding, infiltration of precipitation, and generation of leachate. Plans and cross-sections of the enhanced cap design are provided in Appendix 1.

The enhanced cap was completed in October 2005, under a KDHE-approved Construction Quality Assurance (CQA) Plan, and meets current KDHE surface impoundment standards. A post CQA Report was submitted to, and approved by, the KDHE in March 2006. Copies of KDHE approvals are provided in Appendix 2, and select pictures taken during the various phases of cap enhancement are provided in Appendix 3.

3.1

SUMMARY OF MONITORING TO DATE

The leachate collection system remains in place and in operation. A representative cross-section of the leachate collection system design is provided in Figure 1. Abbott (after notification to the KDHE UIC Program) discontinued using the UIC well for the disposal of the collected leachate since the enhanced cap has been effective in eliminating the leachate from the lagoon. To manage the remaining small volumes of horizontal leachate still collected by the existing leachate collection system, Abbott has elected to pump it to an on-site aboveground holding tank. This may be done after each sampling event dependent upon volume encountered. The leachate will then be properly disposed of offsite on an as-needed basis.

The effectiveness of the enhanced cap at eliminating the leachate from the lagoon has been confirmed by monitoring the volume of leachate collected in the collection sump and comparing it to the volume of precipitation in the area (as measured at the nearby Wichita airport and reported by the National Oceanic and Atmospheric Agency {NOAA} National Weather Service). This comparison shows the volume of leachate collected in the sump remains relatively constant, irrespective of precipitation, leading to the conclusion that the enhanced cap is an effective control for eliminating leachate generation from the former evaporation lagoon.

The sump volume and area precipitation data that's been collected by Abbott to date are provided in Appendix 4. This data shows that before the cap was enhanced, an average of 2,600 gallons per week of leachate was generated. Currently, an average of less than 20 gallons per week of leachate is collected in the sump, resulting in more than a 99% reduction in leachate volume.

Based upon this monitoring and the design of the cap, Abbott has concluded that the small volume of residual leachate that continues to collect in the sump is from soil moisture condensation and the lateral movement of perched water from around the outside edges. This conclusion is supported by the Remedial Facility Investigation confirming perched water in and around the area of the former lagoon at a depth in the zone of the leachate collection system.

To further evaluate the effectiveness of the enhanced cap, Abbott evaluated results of quarterly contaminant monitoring of leachate collected in the leachate collection sump conducted before and shortly

after cap enhancement. This evaluation showed after the new cap was put in place, a significant reduction in leachate collected with no correlation of rain levels, and in general, concentrations of contaminants appear to have decreased since the cap was enhanced. A summary table and graphs of sump leachate contaminants are provided in Appendix 5, and show concentrations of contaminants have decreased overall.

3.2 *MONITORING TO CLOSURE*

Abbott recognizes that the collection sump monitoring data set is limited and additional monitoring is necessary for a more comprehensive evaluation of concentration trends. Once this Post-Closure Plan is approved, Abbott will resume monitoring of both the volume and quality of the leachate accumulating in the sump. All leachate samples will be collected and analyzed in accordance with the Sampling and Analysis Plan (SAP) (attached). Leachate monitoring (LM) will be conducted as follows:

3.2.1 *LM Year 1*

Quarterly monitoring for total volume and concentrations of the following 24 past and potential contaminants:

- 3(n,n-dimethylamino)propyl nitrile
- n-methylcyclohexylamine
- Aniline
- Cyclohexylamine
- Dicyclohexylamine
- n,n-dimethylcyclohexylamine
- n-methyldicyclohexylamine
- o-toluidine
- Pentamethyldipropylenetriamine
- Piperidine
- n-nitrosodi-N-butylamine
- Arsenic
- Ethylbenzene
- Xylene
- Toluene
- Methylene chloride
- 1,1-Dichloroethane
- 1,2-Dichloroethane
- Trichloromethane
- Trichloroethylene
- Tetrachloroethylene
- Tetrachloromethane

- Vinyl chloride
- Benzene

In addition to the above 24 contaminants, the first quarterly sample will also undergo a one-time US EPA Appendix IX analysis (Appendix 6). Contaminant concentrations will be compared to either their respective US EPA Maximum Contaminant Levels (MCLs) or KDHE-approved Tier 2 or 3 Risk-Based Standards prepared in accordance with applicable US EPA methods and the 4th version of the KDHE RSK Manual (hereinafter collectively referred to as Cleanup Standards) as applicable.

Those US EPA Appendix IX-specific contaminants not detected after the four quarterly rounds of monitoring will no longer be analyzed for. Those US EPA Appendix IX contaminants detected will continue to be analyzed for during the remaining monitoring as described below.

3.2.2

LM Years 2-4

Semi-annual monitoring will continue for three additional years (LM Years 2-4) for the 24 listed and any other Appendix IX contaminants that remain a concern based upon LM Year 1 monitoring results.

Abbott and KDHE will then evaluate the contaminant monitoring results from LM Years 2-4 and determine if any further leachate monitoring or collection is needed for the lagoon leachate beyond LM Year 4.

As part of the enhanced cap design, Abbott established a site-specific Operations & Maintenance Plan (O&M Plan) to ensure the integrity of the enhanced cap and leachate collection system is maintained. The O&M Plan ensures the following:

- Cap and cover integrity
- Proper grade
- Berm integrity
- Drainage system integrity and proper flow
- No erosion problems
- Leachate collection system integrity
- Security to restrict access
- Inspections

Abbott has addressed KDHE comments, dated June 23, 2008, and December 30, 2008, in the final O&M Plan (attached).

Cap integrity inspections have been conducted since construction with no problems identified. The O&M Plan specifies that if any conditions affecting cap or leachate collection system integrity are identified during the inspections, repairs/modifications will be implemented as needed. Cap and leachate collection system inspections will continue on a quarterly basis for the first year (O&M Year 1) following approval of this Plan, and if no issues have been identified during the first year, the inspection frequency will be adjusted from quarterly to semi-annually for the next four years (O&M Years 2-5). Each inspection will be documented on a Lagoon Cap and Leachate Collection System Inspection Log described within the O&M Plan. Following O&M Year 5, Abbott and KDHE will review the results of the cap inspections, and if no problems of cap integrity have been encountered, then the inspections will be decreased to a frequency approved by KDHE for as long as Abbott owns and/or is responsible for O&M of the former lagoon.

CONFIRMATION OF LIMITED GROUNDWATER CONTAMINANTS (STEP 4)

REVIEW OF EXISTING DATA

Abbott completed a comprehensive review of over 23 years of groundwater monitoring data to confirm the limited contaminants remaining in the groundwater. The comprehensive data evaluation and conclusions are summarized as follows:

All of the historical data and reports in Abbott's possession (dating back to 1983) were assembled and reviewed. The Resource Conservation and Recovery Act (RCRA) Remedial Facility Investigation (RFI) report that was completed in 1992, which contained long-term data, indicates 100 contaminants had routinely been screened at the site. According to the RFI, these chemicals included all of the potential chemicals used and generated at the facility in addition to those that may have originated from neighboring industrial facilities. A list of these 100 contaminants is provided in Table 1. The RFI further indicates that 59 of the 100 contaminants were excluded as contaminants of concern as they were always non-detect. These 59 contaminants have red strikeouts through them in Table 2. An additional 17 contaminants were also excluded by the US EPA through the RFI process due to their respective low frequencies of detection (10% of the time or less). These contaminants have green strikeouts through them in Table 2. Two contaminants were excluded as they were concluded to be laboratory contaminants. These compounds have violet strikeouts through them in Table 2. The remaining 22 compounds in Table 2 were considered representative contaminants at the site. Of these 22 compounds, it was determined that 10 were not attributable to Abbott and were removed from the list of Abbott contaminants of concern as it was concluded they were never used by Abbott and thought to have migrated onto the site from neighboring facilities. These 10 compounds have dark blue strikeouts through them in Table 2. Therefore, the remaining 12 compounds with no strikeouts and bolded in Table 2 were considered attributable to Abbott.

Abbott conducted a comprehensive review of the historical data associated with these 12 compounds, to confirm the frequency of sampling, analysis, and levels of detection, and to determine whether future monitoring is warranted. A summary table for each compound was created to detail quarters of sampling, wells sampled, and Method Detection Levels (MDLs), where applicable. Each of these summary tables is provided in Appendix 7. As indicated in these tables, each of the

compounds had been routinely analyzed in numerous wells since 1983 (with the exception of toluene - which was last analyzed for in 1991).

5.2

REMAINING CONTAMINANTS

Based upon the extensive data review, we have concluded that nine of the 12 compounds are no longer present as contaminants of concern (COC) and propose to eliminate them as COCs. This conclusion is based upon the fact that the sampling results indicate the compounds have degraded to non-detect or to below applicable standards of comparison (i.e. either respective Preliminary Remediation Goal {PRG}, Maximum Contaminant Level {MCL}, or site-specific risk-based clean-up objective further discussed below) for an extended period of time. Our rationale for this conclusion and for proposing that the nine compounds be eliminated as COCs going forward is as follows:

- 3(n,n-Dimethylamino)propyl nitrile - Decreased concentrations to non-detect since 1990; most recently sampled in 2003. Note that this compound has been sampled in 41 different quarters since it was last detected.
- Aniline - Decreased concentrations to non-detect since 1993; most recently sampled in 2003. Note that this compound has been sampled in 35 different quarters since it was last detected.
- Cyclohexylamine - Decreased concentrations to non-detect since 2000. Note that this compound has been sampled in 14 different quarters since it was last detected.
- n,n-Dimethylcyclohexylamine - Decreased concentrations to non-detect since 1999; most recently sampled in Q1 05. Note that this compound has been sampled in 16 different quarters since it was last detected.
- Pentamethyldipropylenetriamine - Limited concentrations to non-detect since 1995; most recently sampled in Q1 03. Note that this compound has been sampled in 23 different quarters since it was last detected.
- Piperidine - Decreased concentrations to non-detect since 1990; most recently sampled in 2003. Note that this compound has been sampled in 41 different quarters since it was last detected.

In addition, Abbott proposes that benzene and toluene also be eliminated as COCs, as they have been detected only on a sporadic basis and in low

concentrations typically below their respective MCLs. In fact, as shown in Appendix 7, in the past 12 rounds of quarterly monitoring since Q3 1992, wells MW4S, MW-4D, MW-8S, MW-8D, MW-16S, MW-16D, MW-102S, MW-102D, MW-1, MW-101S, MW-101I and MW-101D have been monitored for benzene sporadically, but there have been no detections of benzene above its MCL during any of this monitoring. Furthermore, toluene has never been detected above its MCL in seven rounds of monitoring between 1990 and 1991. As a result, Abbott has not been required to monitor for toluene since that time.

Abbott also proposes that n-methyldicyclohexylamine no longer be considered a COC because it has not been detected above its surrogate standard (the same standard that the US EPA approved using the similarly structured n-methylcyclohexylamine) since 1991 and has been sampled 37 times since then.

Based upon this review, Abbott concludes that the following three compounds remain as COCs at the Site as they have historically been detected during both historical and recent monitoring in 2005-2006:

- n-Methylcyclohexylamine
- Dicyclohexylamine
- o-Toluidine

However, to address KDHE's concern that more recent data is required before they can agree with Abbott's conclusions to eliminate contaminants from concern, Abbott has agreed to monitor for the contaminants listed in Sections 3.2 and 6.1 of this Plan.

IMPLEMENTATION OF MONITORED NATURAL ATTENUATION TO CLOSURE (STEP 5)

Abbott has concluded that monitored-natural attenuation (MNA) is the best approach for formal closure of the former evaporation lagoon. This conclusion is based upon several technical factors, primarily:

- Long-term groundwater monitoring confirms the majority of groundwater contaminants attributable to Abbott have attenuated and degraded over time.
- Concentrations of the limited remaining contaminants in the groundwater are generally decreasing with time.
- Groundwater contaminant modeling indicates contaminant degradation will continue with time to below risk-based standards before reaching the property line.

6.1

GROUNDWATER MONITORING AND REPORTING

MNA will involve continued groundwater monitoring (GWM) to verify there is no off-site migration of any of the COCs in concentrations above established standards. During this monitoring, wells MW-4, 8, 16, and 102 clusters (deep and shallow) will be sampled and analyzed for the three remaining COCs established in Step 4. Abbott proposes to sample these wells based upon their downgradient location from the former lagoon and their representative positioning at the site. The locations of these wells are shown in Figure 2.

To address KDHE's concern that recent (within the last 5 years) groundwater data is needed before potential COCs can be eliminated, Abbott commits to the following groundwater monitoring:

- Semi-annual monitoring of MW-4, 8, 16, and 102 clusters (deep and shallow) for three years (GWM Years 1-3) for the following constituents:
 - 3(n,n-dimethylamino)propyl nitrile
 - n-methylcyclohexylamine
 - Aniline
 - Cyclohexylamine
 - Dicyclohexylamine
 - n,n-dimethylcyclohexylamine
 - n-methyldicyclohexylamine
 - o-toluidine

- Pentamethyldipropylenetriamine
- Piperidine
- n-nitrosodi-N-butylamine
- Arsenic
- Ethylbenzene
- Xylene
- Toluene

Each of these contaminants will be monitored in accordance with the SAP. Contaminant concentrations will then be compared to respective Cleanup Standards.

After each monitoring event, a Semi-Annual Groundwater Monitoring Report will be submitted to the KDHE. This report will summarize the sampling event and results and will include the components detailed in the KDHE Quarterly/Semi-Annual Groundwater Monitoring Report Review Checklist provided in Appendix 8. These reports will include static water level measurements from MW-4, 8, 16, and 102 clusters obtained when monitored by Abbott; as well as static water levels of all the Abbott wells when obtained by Oxy-Chem during their quarterly monitoring of the wells. In addition, an Annual Groundwater Monitoring Report will be submitted to the KDHE by March 1 of each year. This report will summarize the activities and results for Abbott groundwater monitoring from the previous year and will include the components detailed in the KDHE Annual Groundwater Monitoring Report Review Checklist provided in Appendix 8. In addition, this report will provide a table summarizing the previous years results of Oxychem's monitoring of Abbott wells for the following:

- Dichloromethane (Methylene chloride)
- 1,2 Dichloroethane
- Trichloromethane
- Trichloroethylene
- Tetrachloroethylene
- Tetrachloromethane (Carbon tetrachloride)
- Vinyl chloride
- Benzene

6.2

FINAL CLOSURE REPORTING AND KDHE CONCURRENCE OF CLOSURE

When the following conditions are achieved any time after three-years of planned monitoring, Abbott will submit a Final Closure Report and request concurrence of closure with no further action being required from the KDHE:

1. Groundwater samples have not contained any contaminants in concentrations exceeding their respective Cleanup Standards for six consecutive rounds of semi-annual monitoring (for a total of three years of monitoring).
2. Conditions of the enhanced cap remain such that there is no ponding on top of the cap and no significant increase in liquid collected through the leachate collection system.
3. There is no other such evidence of questionable integrity of the enhanced cap.

If the groundwater monitoring confirms any exceedances of respective Cleanup Standards during GWM Years 1-3, such exceedances will be evaluated and either that specific contaminant will continue to be monitored until it is below its Cleanup Standard for six consecutive semi-annual rounds of monitoring, or an alternative approach for that contaminant is developed and submitted for KDHE's consideration and approval. Those COCs for which there have been no exceedances for six consecutive rounds of semi-annual monitoring, will be proposed for removal as a COC and eliminated from monitoring requirements.

If at any time an alternative closure approach is confirmed to be feasible, Abbott reserves the right to implement such approach after obtaining KDHE approval.

Attachment A
Sampling and Analysis Plan

SAMPLING AND ANALYSIS PLAN FOR THE FORMER EVAPORATION LAGOON

*Former Abbott Property
Wichita, Kansas*

March 2009

Prepared by:

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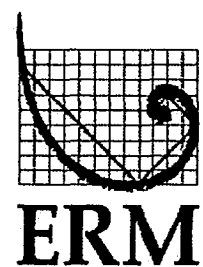


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Abbott had operated an evaporation lagoon (Former Evaporation Lagoon) at its former manufacturing facility in Wichita, Kansas that became a source of groundwater contamination. The lagoon stopped accepting wastewater and was closed in-place. In 2005, Abbott constructed an enhanced engineered cap for the former evaporation lagoon. The goal of the project was to improve the effectiveness of the existing cap to eliminate leachate generation from the former lagoon, and ultimately abandon the existing leachate collection system and its associated deep underground injection well that was used to dispose of the leachate. In addition, the engineered cap will prevent the infiltration of water and minimize potential impact to groundwater.

This document is Abbott's Sampling and Analysis Plan for the post-closure monitoring of leachate and groundwater up-gradient, side-gradient, and down-gradient of the former lagoon and was prepared cooperatively by Abbott Laboratories and Environmental Resources Management.

The former Abbott facility is located at 6765 South Ridge Road, about five miles southwest of Wichita, Kansas. The facility is located in Sedgwick County in the south half of the northeast quarter of Section 33, Range 1 West, Township 28 South at the latitude of 37°34'20"N and a longitude of 97°25'30"W (see Figure 1). The facility property is approximately 20 acres in size and is surrounded by industrial, residential and agricultural lands. The legal description of the property is provided in Appendix 1.

Abbott commenced operations at the site in 1960. The operations originally included the production of cyclohexylamine used in the production of an artificial sweetener. Facility operations later included the production of additional amine-based intermediate products that were used in the production of textiles, rubber, plastics, adhesives and pharmaceuticals.

Abbott sold the facility to Air Products and Chemicals, Inc. in 1985, but retained ownership of Solid Waste Evaporation Lagoon, as well as the evaporation pond, drum storage area and underground deep injection well (see Figure 2). The lagoon was constructed in 1980. Operation of the evaporation lagoon system was managed essentially as a "closed loop" treatment system. That is, a thin layer of wastewater was allowed to evaporate. Un-evaporated wastewater gradually infiltrated through the liner and accumulated in the leachate collection system sump. Periodically the contents of this sump were pumped back into the lagoon and the evaporation/collection cycle continued.

Abbott initiated closure of the evaporation lagoon after it ceased operations at the property in 1985. Closure activities were approved by the Kansas Department of Health and Environment (KDHE). In May 1986, the remaining standing liquid in the evaporation lagoon were removed and disposed of on-site into the deep injection well.

Although the former evaporation lagoon is technically closed, the leachate collection system continues to operate and the collected effluent is stored in an aboveground storage tank at the site. In 2005, Abbott re-constructed the cap as a formal engineered cap to eliminate leachate generation; Abbott used KDHE regulations pertaining to municipal solid waste landfill standards (K.A.R. 28-290-121) as a guideline for the lagoon cap redesign. The redesign and construction provided final slopes, which support vegetation and minimize erosion. All slopes were designed to drain runoff away from the cover and prevent ponding. In addition, the cap design eliminates percolation through the cap. Currently, the cap is covered on all sides and top with grass.

The former Abbott facility has four documented solid waste management units:

- Evaporation pond.
- Evaporation lagoon.
- Hazardous waste drum storage pad.
- Underground injection control deep injection well.

All of the units have been closed under KDHE oversight with the exception of the UIC well that is still permitted to operate, but has not been utilized since 2005.

Groundwater contamination was first discovered at the site in 1977 and first studied in detail in 1979. In 1979, Abbott began operating a voluntary extraction well system to remediate the groundwater below the facility.

The primary source of groundwater contamination was from wastewater discharge to the evaporation pond and evaporation lagoon. The wastewater discharged to the evaporation lagoon averaged 9.1 million gallons per year from 1981 to 1984 and was closed in 1986.

The groundwater contaminants Abbott agrees to monitor for include:

- 3(n,n-dimethylamino)propyl nitrile
- n-methylcyclohexylamine
- Aniline
- Cyclohexylamine
- Dicyclohexylamine
- n,n-dimethylcyclohexylamine
- n-methyldicyclohexylamine
- o-toluidine
- Pentamethyldipropylenetriamine
- Piperidine
- n-nitrosodi-N-butylamine
- Arsenic
- Ethylbenzene
- Xylene
- Toluene

Other groundwater contaminants have been detected in Abbott wells over time during monitoring of the neighboring OxyChem contaminant plume. These include:

- Dichloromethane (methylene chloride)
- 1,2 Dichloroethane
- 1,1 Dichloroethane
- Trichloromethane
- Trichloroethylene
- Tetrachloroethylene
- Tetrachloromethane (carbon tetrachloride)
- Vinyl chloride
- Benzene

However, with the exception of benzene and toluene, these contaminants as well as ethylbenzene and xylene, have not been attributed to Abbott. These contaminants are from other non-Abbott sources.

4.1

REGIONAL SETTING

The facility lies within the Arkansas River lowlands section of the Central Lowlands Physiographic Province. The topography is characterized by the extreme flatness of a broad river valley and the gently rolling slopes rising to the uplands adjacent to the valley. Ground surface elevations range from about 1,300 feet to about 1,320 feet above mean sea level.

4.2

GEOLOGICAL SETTING

4.2.1

Regional Geology

Lower Permian sedimentary rocks of the Cimmaronian Stage form the uppermost bedrock in Sedgwick County. The Wellington Formation, which is poorly exposed due to low resistance to weathering and low topographic relief, is the uppermost bedrock in two thirds of the county. In the western third of the county, the Ninnescah Shale comfortably overlies the Wellington Formation. The Ninnescah Shale is better exposed than the Wellington Formation due to greater topographic relief in the western portion of the county. Both units dip approximately 20 feet per mile to the west-southwest.

Thick unconsolidated Tertiary and Quaternary deposits lie within a depression on the bedrock surface in the Arkansas River Valley. The depression follows the subcrop of the easily dissolved Hutchinson Salt member of the Wellington formation. The Hutchinson Salt is approximately 350 feet thick where it has not been eroded and is generally in the middle of the Wellington Formation. The Pliocene Ogallala Formation lies within the northern half of Sedgwick County and is the oldest unconsolidated deposit present. Undifferentiated Lower Pleistocene, Nebraskan and Kansas glacial-derived deposits overlie the Ogallala in the Arkansas River Valley north of Wichita, and lie on the Permian rocks south of Wichita. These deposits are overlain by Illinoian terrace deposits in the western portion of the Arkansas River Valley and the northern portion of the Ninnescah River Valley. In the upland areas, Illinoian to Recent loess and colluvium overlie the Nebraskan and Kansan deposits. Wisconsinian to Recent alluvium and terrace deposits overlie the Illinoian terrace deposits in the eastern portion of the Arkansas River Valley and in other major stream valleys. Unconsolidated deposits are the major source of groundwater in central Sedgwick County.

Sedgwick County lies within the Sedgwick Basin that is a southerly plunging shelf-like extension of the deeper Anadarko Basin to the south. The Sedgwick Basin is bounded to the east by the Nemaha Anticline, to the west by the Pratt Anticline and to the north by an indistinct saddle marking the boundary of the Salina Phanerozoic Formation. These sedimentary rocks reach thicknesses of as much as 5,599 feet in the deepest parts of the Sedgwick Basin.

Paleozoic rocks in Sedgwick County are roughly 4,000 to 5,000 feet thick. The Cambro-Ordovician Arbuckle Group overlies the Precambrian and consists of cherty dolomite and is at least 700 feet thick in the vicinity of the facility. The Arbuckle Group is overlain by the Ordovician Gimpson Group, the Viola Limestone and the Maquoketa Shale, respectively. Collectively, these units are approximately 200 feet thick in Sedgwick County and are overlain by a thin bed of the Devonian-Mississippian Chattanooga Shale. Roughly 400 feet of Mississippian carbonates overlie the Chattanooga and 2,000 feet of Pennsylvania cyclothermic shales and limestones uncomfortably overlie the Mississippian. Approximately 800 feet of similar cyclothermic shales and limestones of the Gearyan age of the Lower Permian Series overlie the Mississippian Units. The Gearyan Stage is often overlain by anhydride, gypsum and carbonate-bearing shales of the Cimmeronian Stage, which includes The Wellington Formation and the Ninnescah Shale.

The facility is located on the northwest limb of the Bluff City-Valley Center-Ebling Anticline. No known surface faults are present within Sedgwick County. The area is considered seismically stable with low risk of earthquake damage due to its location near the Nemaha Anticline.

4.2.2

Facility Geology

The uppermost bedrock unit below the facility is the Wellington Formation. The Wellington consists of mainly calcareous gray and blue-gray shale containing thick beds of salt and thin beds of gypsum, anhydride and impure limestone. Gypsum beds are most common in the lower part of the formation. The Hutchinson Salt Member lies in the middle of the Wellington Formation but has been removed by solution in the eastern two thirds of Sedgwick County, and partially removed in the area beneath the facility. The Hutchinson Salt Member was not encountered during the bedrock coring performed by URS during the 1992 field investigation portion of the RCRA Remedial Facility Investigation. Within five to ten miles west of the facility, the Hutchinson Salt Member thickens to near its uneroded thickness of approximately 350 feet. The Wellington Formation is approximately 400 feet thick beneath the facility, and ranges in thickness from 80 feet near the east county line,

where it is partly eroded, to 550 feet near the west county line, where the entire thickness of salt and gypsum are present.

The Wellington formation is considered the lowest confining layer for the unconsolidated deposits underneath the facility. These unconsolidated deposits are the major water-producing units in central Sedgwick County. Approximately 100 to 150 feet of the Pleistocene to Recent deposits overlie the Wellington Formation in the vicinity of the facility. The Pliocene-Pleistocene Ogallala Formation has not been identified in the southern part of Sedgwick County, including the facility. The lowermost unconsolidated deposits beneath the facility are the Lower Pleistocene, undifferentiated Nebraskan and Kansan deposits that are overlain by Illinoisan terrace deposits.

The Nebraskan and Kansan deposits consist mainly of tan, sandy silt, sand and fine to medium grained gravel. A few miles south of the facility a layer of volcanic ash known as the Pearlette Ash Bed was encountered in these deposits. The Illinoisan terrace deposits consist of gray, sandy silt, sand and fine to medium grained gravel. Both units thin out to the southwest.

4.3

GROUNDWATER

The unconsolidated deposits that overlie the Wellington Shale comprise the uppermost aquifer at the facility. The Wellington Shale acts as a lower confining layer for the aquifer. Some water is available from the weathered portion of the Wellington, but it tends to be highly mineralized because of the evaporites present in the formation. The productivity of wells completed in the Wellington Formation tends to be low. Because of the low yield and generally poor water quality, most of the wells in the vicinity of the facility do not generally penetrate far into the Wellington Formation (KDHE, 1988).

Although the unconsolidated deposits can generally be differentiated into separate sand and clay units, most wells completed into these deposits are not screened in any single stratigraphic interval. The water obtained from the formations is usually high in dissolved solids, but is suitable for most purposes. The water from the lowest portions of the aquifer may contain undesirable amounts of dissolved salt from the Wellington in the area of the facility.

The aquifer at the facility is generally comprised of two layers of higher and lower permeability, corresponding to sand and clay stratifications.

Boring logs show that the geology underlying the area around the former evaporation lagoon and pond is comprised of approximately 90 to 120 feet

of alluvial deposits that consist of interbedded clays, silts, sands and gravel that exhibit lateral and vertical variations in thickness and grain size over the study area. The sand layers that occur in the alluvial deposits have been given the designations S1 (deepest sand unit) to S4 (shallowest sand unit). Based on the soil boring logs for the Site, the sand units are not laterally continuous layers of the same lithology but represent differing depositional environments. Assuming that the sand unit S2 at MW-4S is the same sand unit S2 at MW-102S may not be correct.

Using the designations as represented throughout the area, the sand units are at the following approximate depths:

- S4 - 20 to 30 feet below ground surface (bgs);
- S3 - 40 to 55 feet bgs;
- S2 - 65 to 85 feet bgs; and
- S1 - 90 feet bgs to the Wellington Shale interface.

Monitoring well clusters have been installed by Abbott and others to monitor the groundwater because of the multi-layered aquifer. The current evaporation lagoon closure groundwater monitoring network incorporates four existing well clusters: MW-4S and MW-4D, MW-8S and MW-8D, MW-16S and MW-16D, and MW-102S and MW-102D. According to historical Abbott documents, i.e. Table 3.3, Facility Monitoring Wells Specifications, March 20, 1991, Table 3, Measured Well Depths, Abbott Laboratories, Wichita, Kansas Facility, 1/17/97, and boring logs, the shallow (S) wells MW-4S and MW-16S are screened in the S2 unit, MW-8S is screened in the S2-S3 units and MW-102S is screened in the S-3 unit. The deep (D) wells are screened in the S1 unit directly above the Wellington Shale.

Regional groundwater flow is generally to the east-southeast, but localized, transient pumping for irrigation, water supply and extraction wells disrupt the regional pattern.

LAGOON LEACHATE AND GROUNDWATER MONITORING PROGRAM

Abbott has established a leachate and groundwater monitoring program that will effectively characterize the quality of both the limited leachate from the lagoon and groundwater. Samples of the lagoon leachate will be collected from the leachate sump as detailed below. Groundwater monitoring will be through a network of wells that will effectively monitor groundwater quality directly downgradient of the former evaporation lagoon. The groundwater monitoring network incorporates four existing well clusters: MW-4S and MW-4D, MW-8S and MW-8D, MW-16S and MW-16D, and MW-102S and MW-102D and are shown in Figure 2. A facility layout showing the Abbott property and location of the former lagoon and known subsurface utilities is provided in Figure 3. Table 1 contains relevant information (including well depths) for each of the monitoring wells. Monitoring well logs are provided in Appendix 2. Table 2 provides horizontal and vertical positions of the wells, with a copy of the Surveyor's Report/Notes for the position of the wells in Appendix 3.

Each of the leachate and groundwater samples will be collected and placed into proper sample containers and analyzed under specified holding times as indicated in Table 3.

At this time, Abbott plans to continue using the KDHE-certified (KDHE certification E-10146) Continental Analytical Services, Inc. (CAS) laboratory for all sample analyses except for the one-time leachate Appendix IX analysis. This analysis will be completed by PACE Analytical Services, Inc. (KDHE Certification E-10116) in Lenexa, Kansas. A summary of the CAS-unique analytical methods is provided in Appendix 4.

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5.1 LAGOON LEACHATE MONITORING (LM)

5.1.1 *Monitoring frequency*

As outlined in the Post-Closure Plan, leachate samples and total volume will be collected on a quarterly basis for the first year (LM Year 1). It is anticipated that these quarterly samples will be collected in March, June, September and December. After LM Year 1, leachate monitoring will then be decreased to semi-annual for three additional years (LM Years 2-4). It is anticipated that these semi-annual samples will be collected in March and September of each year. After LM Year 3, leachate monitoring requirements will be addressed as described in Section 3.2 of the Post Closure Plan.

5.1.2 *Analysis*

Each of the leachate samples will be analyzed for the following:

- 3(n,n-dimethylamino)propyl nitrile
- n-methylcyclohexylamine
- Aniline
- Cyclohexylamine
- Dicyclohexylamine
- n,n-dimethylcyclohexylamine
- n-methyldicyclohexylamine
- o-toluidine
- Pentamethyldipropylenetriamine
- Piperidine
- n-nitrosodi-N-butylamine
- Arsenic
- Ethylbenzene
- Xylene
- Toluene
- Methylene chloride
- 1,1-Dichloroethane
- 1,2-Dichloroethane
- Trichloromethane
- Trichloroethylene
- Tetrachloroethylene
- Tetrachloromethane
- Vinyl chloride
- Benzene

In addition to the above list of analyses, KDHE also requests that the monitoring of the lagoon leachate include a one-time US EPA Appendix IX analysis be done on the samples collected during the first quarterly sampling event. The *US EPA Appendix IX List* is included as Appendix 5.

5.2 GROUNDWATER MONITORING

5.2.1 *Monitoring Frequency*

Groundwater samples will be collected on a semi-annual basis for three years with samples collected in March and September of each year. After three years, groundwater sampling requirements will be addressed as described in Section 6.0 of the Post-Closure Plan (PCP).

5.2.2 *Analysis*

Required analyses of the groundwater samples are as follows:

- 3(n,n-dimethylamino)propyl nitrile
- n-methylcyclohexylamine
- Aniline
- Cyclohexylamine
- Dicyclohexylamine
- n,n-dimethylcyclohexylamine
- n-methyldicyclohexylamine
- o-toluidine
- Pentamethyldipropylenetriamine
- Piperidine
- n-nitrosodi-N-butylamine
- Arsenic
- Ethylbenzene
- Xylene
- Toluene

5.3 REPORTING

Leachate/ground water monitoring reports will be submitted to KDHE by the end of the month following the month of the sampling event (i.e. April, July, October and January for the first year and April and October the following years.) Groundwater monitoring will not be included in the April and January quarterly reports during the first year as there is no monitoring well sampling at those times. An annual ground water monitoring report will also be submitted to KDHE by March 1 of each

year, which will include both leachate and ground water monitoring summary and results.

These reports will contain the information outlined in the KDHE Quarterly/Semi-Annual and Annual Report Review Checklists.

5.4 *FIELD PROCEDURES*

5.4.1 *Field Records*

Field observations and other information pertinent to the collection of leachate samples will be recorded in the dedicated field book and groundwater samples will be recorded on the Groundwater Sample Collection Field Sheets (Appendix 6) using a permanent ink pen. Additional observations will be recorded in a bound dedicated field logbook. The data to be recorded for each sampling will include date, time (24-hour time reference), sample number, sample location, and the name of the person(s) collecting the sample and shipper name. In addition, general information will be recorded daily in the logbook, including personnel present, weather, and daily sampling objectives. Photographs will be taken to document sampling activities.

Equipment used for measuring, purging and sampling during the event will be maintained and calibrated in accordance with its respective manual, which is available to the sampler during the event. Calibration results are to be recorded in the logbook.

5.4.2 *Inspection, Water Levels and Total Depth of Well Measurements*

The leachate collection system will be inspected for integrity and other indications of problems. The Cap Inspection Log and Leachate Sump Inspection Log included in the O&M Plan are to be used for the inspection and have been included in this SAP as Appendix 7. Inspection notes and conditions will be documented in field notes and the Inspection Logs as appropriate.

At the very beginning of each groundwater monitoring effort, each monitoring well shall be inspected for integrity and other indications of problems with respect to the condition of the well pad, casing, reference mark, well identification and protective casing. This information will be entered onto the Monitoring Well Inspection Log included in Appendix 7.

The water level in the leachate collection sump and all of the wells in the monitoring network will be measured within a 24 hour period prior to beginning purging and sampling in order to provide a "snapshot" of current leachate volumes and groundwater level/table. Levels will be measured using an electronic water level indicator. The decontaminated

indicator probe will be inserted into the well and lowered until groundwater is encountered. Water level data will be reported to the nearest 0.01 foot always from the reference mark on the north side of the collection sump and monitoring well casing for consistency in measurement. The total depth of each well will also be measured using an electronic water level indicator. The total depth from the reference mark on the north side of the top of the casing will be measured to the nearest 0.01 foot and corrected to account for the length of the probe tip, if applicable.

Water level data and total depth of wells will be recorded on the Groundwater Sample Collection Field Sheet located in Appendix 6. Measurements of the leachate collection sump will be recorded in the log book.

5.4.3

Well Purging

Following the well inspections and water level measurements, each well will be purged to assure that the groundwater sample collected is representative of aquifer conditions. Purging and groundwater sampling will be performed using a low-flow sampling technique with a maximum flow rate of 0.5 liters per minute (Low-Flow Groundwater Sampling Procedures, R. Puls and M. Barcelona, U.S. EPA Groundwater Issue, April 1996 EPA/540S-95/504). Groundwater will be withdrawn from the well using a bladder-type pump with dedicated disposable tubing used at each monitoring location. The groundwater will be withdrawn from midway of the screened portion of the current water column within each well. (See Table 1 for screened intervals)

Prior to collecting each groundwater sample, the field parameters listed below will be measured with a multi-parameter, pH, temperature, specific conductivity and dissolved oxygen meter. The meter probe will be placed within a flow cell through which the purge water flows and empties into a holding container. If turbidity is measured, using a separate meter is advised. Well drawdown will be monitored using an electronic water level indicator inserted in the well and measurements will be recorded at the intervals with the stabilization parameters. The goal is <0.1 m (0.3 feet) maximum drawdown during purging after pumping has commenced. A minimum of one purge volume of water will be withdrawn prior to sampling and the monitoring well will be considered stabilized when three successive field measurements, taken 3 to 5 minutes apart, fall within the following criteria:

- ± 0.1 for pH
- $\pm 3\%$ for specific conductivity
- $\pm 10\%$ for turbidity

• $\pm 10\%$ for Dissolved Oxygen

To determine the volume of standing water present in the well the following formula will be used:

$$V = 0.041D^2H$$

Where:

H = measured depth of water (feet) from surface to the bottom of the well

D = diameter of well (inches)

V = volume of water (gallons)

In the event a well does not readily recharge and in effect goes dry during purging, notation will be made on the field sheet and in the log book and an attempt to sample using a disposable bailer will be made after sufficient time has elapsed for recharge. (See Section 5.3.4)

5.4.3.1 Well Purging With a Disposable Bailer

If problems occur with the performance of the pump being used, and a replacement cannot be readily accessed, a disposable bailer may be utilized. In this instance, three casing volumes must be removed prior to sampling. Casing volume, in gallons, is calculated using the following equation:

$$(\pi * r^2 * h * 7.48 \text{ gal/ft}^3)$$

Where:

$\pi = 3.14$

r = radius of well in feet

h = number of linear feet of static water

Field stabilization parameters are measured by placing sufficient amount of purge water into a container with the meter probe. Drawdown is irrelevant in this method, and turbidity can be an issue.

A length of bailer twine approximately 10 feet longer than the depth to water is tied securely to a fresh disposable bailer. To prevent loss of bailer in well, create a slip knot in the other end of the twine to loop around sampler's wrist. Lower the bailer slowly into the water column and remove the groundwater, placing it into holding container to be emptied into drums later. The volume removed may be determined by either marking the holding container or knowledge of the volume contained in one filled bailer. Field parameters may be measured at notated volume increments by filling the container with the probe with fresh purge water.

This process continues until the necessary volume has been removed and the field parameters have stabilized, if required.

5.4.4

Sample Collection

Sampling personnel will wear fresh latex or nitrile gloves for each leachate and groundwater sample point while purging and sampling. Samples will be placed into the containers specified in Table 3 and placed immediately into a cooler with ice.

All samples will be stored at 4°C until analyzed.

A field equipment list is provided as Appendix 8.

After sampling is complete, all non-dedicated sampling equipment will be decontaminated as described in Section 5.6. All purge and decontamination water will be containerized, sampled and analyzed under the same analytical protocol as the groundwater samples. Once sample analytical data is analyzed, if results are below applicable standards, the purge/decontamination water will be discharged to the ground surface. If analytical data is not acceptable, the water will be disposed of in accordance with regulatory guidelines.

5.4.4.1 Leachate Sample

The leachate sample will be collected using the method dictated by flow conditions at the time of the sampling. These methods are detailed below in the order of preference.

1. If there is sufficient flow into the sump, a sample will be collected from the flow stream by holding the decontaminated "catch" container, described in 2, under the stream, avoiding contact with the sides of the sump if possible to minimize cross-contamination.
2. In the event there is not sufficient direct flow from which to collect a sample, a dedicated "catch" container (i.e. 1-5 gallon bucket will be suspended below the inlet pipe to collect the leachate flow between sampling events as it enters the sump. The sample will then be collected directly from the leachate collected in this container. This container is to be decontaminated during each sampling event to minimize cross-contamination from previous flow periods.

First to be sampled is the amine sample, followed by the n-nitrosodi-N-butlamine sample, the total arsenic sample and last, the dissolved arsenic sample.

The sample for dissolved arsenic will need to be placed into an amber non-preserved 500mL or 1 liter bottle and be sent to the laboratory to be filtered unless equipment such as a hand pump or peristaltic pump is available to pump from the "catch" container through a 45 micron disposable filter and into the specified container.

5.4.4.2 Groundwater Samples

Following groundwater well stabilization, groundwater samples will be collected directly from the outflow of the dedicated tubing in each well. The flow rate will be kept constant with that used to stabilize the well, and will be within 100-500 ml/min. First to be sampled is the amine sample, followed by the n-nitrosodi-N-butylamine sample, the total arsenic sample and last, the dissolved arsenic sample.

The dissolved sample is to be field-filtered using an in-line 45 micron disposable filter attached at this time to the dedicated tubing. When a duplicate sample is collected, fill the duplicate container before proceeding to the next parameter sample.

When a disposable bailer must be used for sample collection, the bailer is to be lowered as gently as possible into the water column and allowed to fill completely before removing. The sample containers are then filled from the bottom of the bailer, if possible, using the disposable plastic adaptor furnished with the bailer. It may take several bailer fills to collect entire sample. Sampler needs to be especially diligent in preventing outside contamination or excessive exposure of sample to air with this method. In this case, the dissolved arsenic sample will be handled as described in 5.4.4.1.

5.4.5 Collection of Quality Control Samples

Field duplicate samples are analyzed to check for sampling and analytical reproducibility. Field duplicates will be collected at a rate of one field duplicate per monitoring event by filling a second set of sample containers from the chosen well. This sample will be designated as outlined in Sections 5.4.2 through 5.4.4. Often the time of collection given to the lab is a generic time in order to keep the original sample unknown. Notation of duplicate (with generic and actual collection times) will be made on the corresponding sample collection field sheet and in the log book.

Matrix spike/matrix spike duplicate samples (MS/MSD), which are used for the VOC analysis, will be collected at a rate of one per monitoring event. These QC samples will be collected by alternately filling three sets of sample containers (one for sample, one for MS and one for MSD.)

These samples will be designated as outlined in Sections 5.4.2 through 5.4.4. Notation of MS/MSD samples will be made on the field sheet and in the log book.

As dedicated sample tubing or disposable bailers will be used to collect the groundwater samples, no equipment rinsate blanks will be collected. There will be one trip blank included in each cooler sent to the laboratory, which will be analyzed for volatile organic compounds to determine if the samples have been exposed to contamination during transport. This trip blank must appear on the Chain-of-Custody.

5.5 *SAMPLE HANDLING, DOCUMENTATION, AND TRACKING*

5.5.1 *Sample Containers and Sample Preservation*

Sample containers for amines are 1-liter glass bottles, non-preserved. Sample preservation requirements are refrigeration equal to 4°C. Holding times are 14 days.

Sample containers for n-nitrosodi-N-butlamine sample are 1-liter glass bottles, non-preserved. Sample preservation requirements are refrigeration equal to 4°C. Holding times are 7 days.

Sample containers for total and dissolved arsenic are 250 mL plastic bottle, preserved with nitric acid. Sample preservation requirements are refrigeration equal to 4°C. Holding time is 6 months.

5.5.2 *Sample Labeling*

All samples for analysis, including QC samples, will be given unique sample numbers.

Two identification numbers, a project sample number and a laboratory sample identifier, will be used for each groundwater sample. The project sample number, which highlights the sample location, will be used for presentation of the data in memoranda and reports. The laboratory identifier is assigned by the laboratory custodian at the time of sample receipt and is the primary means of tracking a sample through the laboratory.

5.5.3 *Project Sample Numbering System*

The project sample numbers will be composed of the following four components:

- Project Identifier. A three-character designation will be used to identify the facility for which the sample will be collected. For this project, it will be ALW. ALW stands for Abbott Laboratories Wichita.
- Sample Location. A four to five-character code will be used to identify the monitoring well location.
- Monitoring Event. A numerical designation shall be used to indicate the monitoring round (1, 2, 3, etc.).
- QC samples. Field QC samples will have additional character codes. "DP" denotes a duplicate sample.

For example,

- Sample No. ALWMW4S2DP would indicate the following:

ALW - Abbott Laboratories Wichita project

MW4S - collected from monitoring well MW-4S

2 - 2nd round of groundwater sampling

DP - Field duplicate sample

5.5.4 *Laboratory Sample Identifier*

The laboratory identifier for the laboratory will be an 11 digit number in the following format: YYMMCBBB-XXX, when YYMMCBBB is the batch number, and

YYMM = year/month (e.g., 9301);

C = Laboratory identifier (e.g., C = Continental)

BBB = A computer-assigned consecutive batch number, which rolls over after 999 to 001: and

XXX = A consecutively assigned sample number unique to a specified field sampling point.

Upon arrival at the laboratory, the laboratory batch number will be recorded by the laboratory custodian/sample log-in person on the chain-of-custody form and on the bottle label using a permanent marker.

5.5.5

Chain-of-Custody Procedures

A chain-of-custody record will accompany each sample shipment to establish the documentation necessary to track sample possession from the time of collection through laboratory analysis. The record will contain the following information:

- Accompanying each shipment container will be a chain-of-custody form documenting the contents of the shipment container. The information on the chain-of-custody form will include signature of collector, project sample identification numbers, sample matrix, sample collection date and time, inclusive dates and times of possession, analysis required, type and number of sample containers per sample, and preservatives (if any).
- Two custody seals will be used on each shipment container to secure the lid and provide evidence that samples have not been tampered with. The seals will be signed by the sampler and covered with clear tape after being affixed to the shipment container to prevent inadvertent damage.
- Every sample in the associated shipment container will be documented on the chain-of-custody form.
- The project name and associated project work order number will also be written on the chain-of-custody form.
- The sampler will sign and date the chain-of-custody form as relinquisher of the samples to the shipment courier.
- The carrier service is not required to sign the chain-of-custody form if the chain-of-custody seals remain intact. The air-bill number and the chain-of-custody seal numbers will be written on the chain-of-custody form.

A sample chain-of-custody form is provided as Appendix 9.

5.5.6

Sample Packaging and Shipment

Samples will be shipped in accordance with U.S. Department of Transportation (DOT) regulations. Sample shipment delivered by the sampling will be sent for overnight delivery after completion of each day of sampling.

Following sample collection, the exteriors of all sample containers will be wiped clean with a moist cloth. The filled sample containers will not be sprayed with water during decontamination because this water could contact the sample if the container is not tightly sealed. In preparation for shipment to the analytical laboratory, all samples will be packaged in accordance with the following procedures:

- Each sample container will be checked to ensure the container lid is securely tightened.
- Each sample container will be checked to ensure the sample label has been securely affixed to the container and completely and correctly filled out with the appropriate sample I.D. number, name of collector, sample date, sample time of collection, sample type, amount and type of preservative, and analytical parameters as a minimum requirement.
- Glass sample containers will be wrapped in bubble wrap and placed in polyethylene bags. The temperature will be maintained at 4°C with ice that is sealed in double-bagged plastic bags. The remaining space in the shipment container will be filled with additional packing material.
- The completed chain-of-custody form identifying the contents of the sample shipment container will be placed in a large zip-lock bag and taped to the inside lid of the shipment container (the sampler's copy of the form will first be removed).
- The lid of the shipment container will be closed and sealed shut with strapping tape. If the shipment container has a drain port, it will also be sealed shut with tape.
- The shipment air-bill will be affixed to the top of the container and will identify the shipper's and recipient's names and addresses.
- The signed custody seals will be used on each shipment container and covered with clear tape after being affixed to the shipment container.

5.6

DECONTAMINATION

All non-dedicated equipment involved in field sampling activities will be decontaminated prior to and subsequent to sampling. Non-dedicated equipment will be decontaminated using the following procedure:

- Scrub equipment thoroughly with a soft bristle brush in a low-sudsing phosphate-free detergent (e.g. Alconox®).
- Rinse equipment with distilled water by submerging and/or spraying and allowing to air dry for one to two minutes.
- Rinse equipment a second time with distilled water by spraying until dripping.
- Rinse equipment a third time with distilled water by spraying until dripping.
- Place equipment on polypropylene or aluminum foil and allow to air dry.
- Wrap equipment in polypropylene or aluminum foil for handling/or storage until next use.

Extraneous contamination and cross-contamination will be controlled by using the proper decontamination procedures, wrapping sampling equipment in aluminum foil or plastic when not in use, and requiring field personnel to change sampler gloves immediately prior to collecting each investigative sample.

As stated earlier in this document, Abbott plans to continue using the KDHE-certified CAS laboratory for all sample analysis.

Previously referenced Table 3 contains reporting levels, holding times, analytical methods and laboratory lowest reporting limits.

6.1

DATA VALIDATION

Validation of the laboratory data and QA/QC methods will be conducted by reviewing and evaluating the following items in the laboratory analytical reports:

- Equipment Blanks (if collected) and Trip Blanks
 - If there are detections, the effect on analytical results of the represented samples must be determined and notated.
- Duplicates
 - Verify that the duplicate concentrations, if detected, are similar to the original sample concentrations.
- Holding Times
 - Verify that all samples were prepared for analysis within the allowed holding time listed in Table 3. If this time has been exceeded, the effect on analytical results of the represented samples must be determined and notated.
- Sample Surrogate Recoveries
 - Verify that the percentage of each of the recoveries fall within the allowable ranges presented in the laboratory report. If outside the range allowed, the effect on analytical results of the represented samples must be determined and notated.
- Matrix Spike/Matrix Spike Duplicates
 - Note any samples that were not represented by a MS/MSD.
 - Verify that the percentage of each of the recoveries fall within the allowable ranges presented in the laboratory

report. If outside the range allowed, the effect on analytical results of the represented samples must be determined and notated.

- Method Blanks
 - If there are detections, the effect on analytical results of the represented samples must be determined and notated.
- Laboratory Control Data
 - Review laboratory control spike and calibration curve verification quality control sample results. Any laboratory control samples that reported recoveries outside the allowable percentage ranges must be noted and the effect on analytical results of the represented samples determined.

A monitoring well may become partially filled with sediment over time causing a decrease in the performance of the well screen and the groundwater interval represented by samples collected. This is called occlusion and can be determined to have occurred by measuring the total depth of the monitoring well and comparing this measurement to the total depth at the time of installation of the well.

In the event that greater than 25 percent of the effective screen of a monitoring well is occluded, the well will be redeveloped. This will be accomplished by using a submersible pump, which is stronger than a low flow pump. The pump is lowered to the top of the sediment blockage where it pulls both water and sediment from the well. By raising and lowering the pump slowly and slightly, the sediment is removed from the casing and surrounding sand pack. Continue this process until the discharge is relatively clear.

If required, stabilization parameters may be measured using the method outlined in Section 5.3.3.1, *Well Purging With a Disposable Bailer*. The flow will be too great for a flow cell to be used.

Documentation of redevelopment will be entered into the Site field logbook and also on the Groundwater Sample Collection Field Sheet provided in Appendix 6.

Discharge is to be treated as purge water, i.e. containerized until disposal method is determined. Dedicated tubing and decontamination procedures are to be followed as outlined in previous sections for purging and sampling.

Tables

Table 3
Leachate and Groundwater Sample Collection and Analytical Protocols
Abbott Property
Wichita, Kansas

| Analyte | Sample Type | Analytical Method | Anticipated Practical Quantitation Level | Sample Container | Preservative | Holding Times |
|----------------------------------------|-------------------------|--------------------------------------|------------------------------------------|----------------------|------------------|-----------------------------------------|
| n-methylcyclohexylamine | Leachate Groundwater | Abbott/CAS GC-NP procedure | 0.25 mg/l | 1 liter amber | None | 14 Days Preparation 40 Days Analysis |
| Dicyclohexylamine | Leachate Groundwater | Abbott/CAS GC-NP procedure | 0.25 mg/l | 1 liter amber | None | 14 Days Preparation 40 Days Analysis |
| o-Toluidine | Leachate Groundwater | EPA Method 8141A(M), 625/3510C | 0.28 ug/l | 1 liter amber | None | 7 Days Preparation 40 Days Analysis |
| 3(n,n- dimethylamino)propyl nitrile | Leachate Groundwater | Abbott/CAS GC-NP procedure | 0.25 mg/l | 1 liter amber | None | 14 Days Preparation 40 Days Analysis |
| Aniline | Leachate Groundwater | Abbott/CAS GC-NP procedure | 0.25 mg/l | 1 liter amber | None | 14 Days Preparation 40 Days Analysis |
| Cyclohexylamine | Leachate Groundwater | Abbott/CAS GC-NP procedure | 0.25 mg/l | 1 liter amber | None | 14 Days Preparation 40 Days Analysis |
| n,n-dimethylcyclohexylamine | Leachate Groundwater | Abbott/CAS GC-NP procedure | 0.25 mg/l | 1 liter amber | None | 14 Days Preparation 40 Days Analysis |
| n-methyldicyclohexylamine | Leachate Groundwater | Abbott/CAS GC-NP procedure | 0.25 mg/l | 1 liter amber | None | 14 Days Preparation 40 Days Analysis |
| Pentamethyldipropylenetriamine | Leachate Groundwater | Abbott/CAS GC-NP procedure | 2.5 mg/l | 1 liter amber | None | 14 Days Preparation 40 Days Analysis |
| Piperidine | Leachate Groundwater | Abbott/CAS GC-NP procedure | 0.25 mg/l | 1 liter amber | None | 14 Days Preparation 40 Days Analysis |
| n-nitrosodi-N- butylamine | Leachate Groundwater | EPA 8270 | 10 ug/l | 1 liter amber | None | 7 Days Preparation 40 Days Analysis |
| Arsenic | Leachate Groundwater | EPA 6010 | 10 ug/l | 250 ml plastic | HNO ₃ | 7 Days Preparation 40 Days Analysis |
| Ethylbenzene | Leachate Groundwater | EPA 8260 | 5 ug/l | 3-40 ml VOC vials | HCL to pH<2 | 14 Days Analysis |

| Analyte | Sample Type | Analytical Method | Anticipated Practical Quantitation Level | Sample Container | Preservative | Holding Times |
|---------------------|-------------------------|-------------------|------------------------------------------|----------------------|--------------|------------------|
| o-Xylene | Leachate Groundwater | EPA 8260 | 5 ug/l | 3-40 ml VOC vials | HCL to pH<2 | 14 Days Analysis |
| m+p-Xylene | Leachate Groundwater | EPA 8260 | 10 ug/l | 3-40 ml VOC vials | HCL to pH<2 | 14 Days Analysis |
| Toluene | Leachate Groundwater | EPA 8260 | 5 ug/l | 3-40 ml VOC vials | HCL to pH<2 | 14 Days Analysis |
| Methylene Chloride | Leachate | EPA 8260 | 5 ug/l | 3-40 ml VOC vials | HCL to pH<2 | 14 Days Analysis |
| 1,1-Dichloroethane | Leachate | EPA 8260 | 5 ug/l | 3-40 ml VOC vials | HCL to pH<2 | 14 Days Analysis |
| 1,2-Dichloroethane | Leachate | EPA 8260 | 5 ug/l | 3-40 ml VOC vials | HCL to pH<2 | 14 Days Analysis |
| Trichloromethane | Leachate | EPA 8260 | 5 ug/l | 3-40 ml VOC vials | HCL to pH<2 | 14 Days Analysis |
| Trichloroethylene | Leachate | EPA 8260 | 5 ug/l | 3-40 ml VOC vials | HCL to pH<2 | 14 Days Analysis |
| Tetrachloroethylene | Leachate | EPA 8260 | 5 ug/l | 3-40 ml VOC vials | HCL to pH<2 | 14 Days Analysis |
| Tetrachloromethane | Leachate | EPA 8260 | 5 ug/l | 3-40 ml VOC vials | HCL to pH<2 | 14 Days Analysis |
| Vinyl Chloride | Leachate | EPA 8260 | 5 ug/l | 3-40 ml VOC vials | HCL to pH<2 | 14 Days Analysis |
| Benzene | Leachate | EPA 8260 | 5 ug/l | 3-40 ml VOC vials | HCL to pH<2 | 14 Days Analysis |

mg/l – Milligrams per liter, ug/l – Micrograms per liter